

# PATENT ABSTRACTS OF JAPAN

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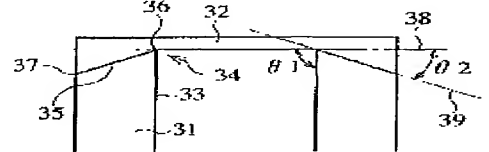
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## (54) CONTAINER MADE OF RESIN

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To ensure hermetical sealability without causing crack and damage of a container and to enable easy, sure heat sterilization by inclining a face being in contact with a cap on an opening so that it becomes lower from its inner perimetral edge to an outer perimetral edge and also specifying the angle of the inclination at the inner perimetral edge.

**SOLUTION:** The internal wall of the opening of a bottle 31 which is covered with a cap comprising a sealing material 32 is formed in such a shape that when the bottle is hermetically sealed, the internal wall and the cap are in contact with each other at an angle  $\theta 1$  of 90 to 135°. In the case of an angle  $\theta 1$  of less than 90°, air bubbles tend to accumulate on a line 34 where the internal face 33 and cap are in contact with each other, with the result that a portion which is difficult to transfer heat applied during heat sterilization occurs. Also, a face 35 being in contact with the cap on the opening is so inclined as to become lower from its inner perimetral edge 36 to outer perimetral edge 37. Further, the angle  $\theta 2$  of the inclination of the face 35 being in contact with the cap on the opening to the inner perimetral edge 36 is set 0° or more to less than 35°. Here, the angle  $\theta 2$  of the inclination of the face 35 to the inner perimetral edge is an angle formed by the face 35 and the face 38 of the opening at the inner perimetral edge 36.



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**CLAIMS**

[Claim(s)]

[Claim 1] It is the configuration to which the wall of opening of said bottle touches said lid at the include angle of 90 – 135 degrees on the occasion of seal including the bottle made of resin, and the lid made of resin. the field which touches said lid of said opening — among those, the container made of resin with which the tilt angle in the inner circumference edge of the field which inclines from a periphery edge so that it may become low toward the periphery edge, and touches said lid of said opening is characterized by being less than 35 degrees 0 times or more.

[Claim 2] The container made of resin according to claim 1 whose field which touches said lid of said opening is flatness ranging from said inner circumference edge to said periphery edge and whose tilt angle in said inner circumference edge is 5 times [ less than 35 ] or more.

[Claim 3] The container made of resin according to claim 1 whose field which touches said lid of said opening is a convex curved surface ranging from said inner circumference edge to said periphery edge and whose tilt angle in said inner circumference edge is 0 times [ less than 35 ] or more.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the container made of resin for filling up an eating-and-drinking article etc. with low temperature enough simple which can heat-sterilize.

[0002]

[Description of the Prior Art] as the container for being filled up with the eating-and-drinking article of liquids, such as various drinks, in recent years -- both containers made of resin, such as a PET bottle, especially a bottle and a lid -- although -- from viewpoints, such as a light weight, low cost, and simple nature, what is a product made of resin is evaluated by the consumer, and is used. [ many ]

[0003] However, resin is inferior in physical reinforcement compared with ingredients, such as a metal and glass, and if the impression force at the time of screwing on or capping the bottle made of resin with the lid made of resin is made high, in order to cause a crack, breakage, etc., this impression force is restricted. Therefore, there is a trouble that it is difficult to acquire high sealing performance, without generating a crack, breakage, etc. of a container.

[0004] In order to acquire high sealing performance, without generating a crack, breakage, etc. of a container, as shown in drawing 1 The regio-oralis opening end face 15 of a bottle 11 becomes low toward the periphery edge 17 to the inner circumference edge 16 (in addition, the height at the time of turning bottle opening to the bottom is meant as illustrated in a drawing in this specification with the location of a bottle effective area is "high", and "it being low"). An inclination is prepared and the container made of resin with which it was made for the sealant 12 of a lid and the opening end face of a bottle 11 to touch in this field is proposed conventionally. Moreover, as shown in drawing 2, the container made of resin which established the inclination (26 27) in both the inner circumference edge of the regio-oralis opening end face 25 of a bottle 21 and the periphery edge is used conventionally. When these containers [ like ] are adopted, a crack, breakage, etc. of a container are not generated and sealing performance becomes good.

[0005] However, in the case of such a container made of resin, in near the touching line (14 24) of the wall (13 23) of a bottle, and a sealant (12 22), it is easy to produce a groove detailed opening. Such a groove opening will tend to be in a condition [ that air bubbles are attached there in the process of sterilization after seal although the sealing performance of a container was not influenced ], microorganisms, such as a fungus, are not \*\*\*\*(ed) by the liquid, but it is hard to transmit the heat applied on the occasion of heat sterilization, and it can become. Since a microorganism may breed even if sealing performance is not spoiled after that, when such a microorganism remains, in order to also sterilize enough the microorganism which is not \*\*\*\*(ed), it is necessary to perform sterilization of an elevated temperature and long duration comparatively.

[0006] On the other hand, since deformation of a container will be caused compared with metal or a glass container if thermal resistance is inferior in the container made of resin and heat sterilization temperature is made into an elevated temperature, whenever [ stoving temperature / in the case of performing heat sterilization ] is restricted. The thermal conductivity of the container made of resin is also still lower. Therefore, with the container made of resin, when heat-sterilizing after filling up a container with an eating-and-drinking article, it is necessary to control temperature strictly and to sterilize by the long time, and there is a trouble that cost starts so that sterilization in the groove aforementioned opening etc. can also fully be performed and deformation of a container can be prevented.

[0007]

[Problem(s) to be Solved by the Invention] The purpose of this invention is to offer the container made of resin which can acquire high sealing performance, does not produce a groove detailed opening in the container lumen after seal, but can ensure [ simple and ] heat sterilization, without generating a crack, breakage, etc. of a container.

[0008]

[Means for Solving the Problem] When this invention persons examined the survival microorganism at the time of heat sterilization processing in the container made of resin which has opening of various configurations in order

to solve the above-mentioned technical problem, they completed a header and this invention for the ability of the container which has opening of a specific configuration to solve the above-mentioned technical problem. [0009] Namely, according to this invention, it is the configuration to which the wall of opening of said bottle touches said lid at the include angle of 90 – 135 degrees on the occasion of seal including the bottle made of resin, and the lid made of resin. the field which touches said lid of said opening — among those, from a periphery edge, it inclines so that it may become low toward the periphery edge, and the container made of resin with which the tilt angle in the inner circumference edge of the field which touches said lid of said opening is characterized by being less than 35 degrees 0 times or more is offered.

[0010] Moreover, according to this invention, the field which touches said lid of said opening is flatness ranging from said inner circumference edge to said periphery edge, and said container made of resin whose tilt angle in said inner circumference edge is 5 times [ less than 35 ] or more is offered.

[0011] Furthermore, according to this invention, the field which touches said lid of said opening is a convex curved surface ranging from said inner circumference edge to said periphery edge, and said container made of resin whose tilt angle in said inner circumference edge is 0 times [ less than 35 ] or more is offered.

[0012]

[Embodiment of the Invention] It explains referring to drawing 3 , drawing 4 , etc. which illustrate the example of a concrete mode for the container made of resin of this invention hereafter.

[0013] The container made of resin of this invention contains the bottle made of resin (31 41), and the lid made of resin. Especially as resin which constitutes these, it is not limited but various kinds of resin, such as polyethylene terephthalate (PET), polypropylene (PP), and polyethylene (PE), can be used. The gestalt of the lid made of resin should be limited especially when opening of a bottle could be sealed, but it should be made into various kinds of gestalten which can cover opening by screwing or capping, and should fabricate the lid and the sealant as a thing of one, including the sealant (32 42) illustrated in drawing 3 and drawing 4 . In drawing 3 and drawing 4 , although the sealant is illustrated as a thing of the same dimension as the outer diameter of bottle opening, it can also be made [ what is larger than this or ] small. In addition to the quality of the material which can constitute bottles, such as PET, PP, and PE, etc., polystyrene (PS) etc. can be used although especially the quality of the material of said sealant is not limited.

[0014] In the container made of resin of this invention, the wall (33 43) of opening of a bottle (31 41) is a configuration which touches a lid at the include angle of 90 – 135 degrees on the occasion of seal. The range of the angle theta 1 which the sealant (32 42) contained in a wall (33 43), the body of a lid, or a lid specifically makes is 90 – 135 degrees, and it can be preferably made into 90 – 120 degrees. the line (34 44) top by which a wall (33 43) and a lid touch when theta 1 is less than 90 degrees — air bubbles — collecting — being easy — the heat applied on the occasion of heat sterilization — transmitting — being hard — the part to obtain arises, when exceeding 135 degrees, the reinforcement of a point falls and there is un-arranging, such as becoming easy to cause the trouble on quality control.

[0015] In addition, although the field (35 45) which touches the lid of opening of a wall (33 43) and a bottle makes a right angle or an acute angle in the inner circumference edge (36 46), a wall (33 43) touches a lid at an angle of said specification substantially, and as long as it can prevent air bubbles collecting, it can be made into the configuration which beveled the inner circumference edge.

[0016] the field (35 45) which touches the lid of opening of a bottle in the container made of resin of this invention — among those, from a periphery edge (36 46), it inclines so that it may become low toward the periphery edge (37 47). In this specification, the height at the time of turning bottle opening to the bottom as above-mentioned with the location of the field of bottle opening is “high” and “it being low” is meant. It is desirable to use it as the angle of less than 45 degrees 5 times or more, although especially the angle theta 3 that the line (39 49) which connects the inner circumference edge and the periphery edge makes with the field (38 48) of opening of a bottle is not limited.

[0017] In the container made of resin of this invention, the tilt angle in the inner circumference edge (36 46) of a field (35 45) is 0 times [ less than 35 ] or more. The tilt angle in the inner circumference edge of a field means the angle theta 2 which a field (35 45) and the field (38 48) of opening make in the inner circumference edge (36 46) here.

[0018] Although especially the mode of the field which touches the lid of opening in the container made of resin of this invention is not limited, it can make a field 35 flat ranging from said inner circumference edge to said periphery edge as specifically shown in drawing 3 . That is, in this case, if the field 35 has circular opening, it will serve as a configuration of a truncated-cone configuration. In this case, the angle which a field 35 and the field 38 of opening make turns into a tilt angle. Thus, when the field which touches the lid of opening is flat, angle theta 2 needs to serve as an include angle exceeding 0 times, and it is desirable that it is [ 5 times or more ] less than 35 degrees.

[0019] Moreover, a field 45 can also be made into a convex curved surface as shown, for example in drawing 4 . In this case, as for said tilt angle theta 2, it is desirable to use it as the angle of less than 45 degrees 5 times or

more, although especially the angle theta 3 that the line 49 which can take 0 times or more for less than 35 degrees, and connects the inner circumference edge 46 and the periphery edge 47 makes with the field 48 of opening of a bottle is not limited.

[0020] Furthermore, a field 55 can also be made into a convex polygon-like configuration as shown, for example in drawing 5. It is desirable to use it as the angle of less than 45 degrees 5 times or more, although especially the angle theta 3 that the line 59 which can make said tilt angle theta 2 less than 35 degrees 0 times or more also in this case, and connects the inner circumference edge 56 and the periphery edge 57 makes with the field 58 of opening of a bottle is not limited.

[0021] Heat sterilization can be presented with it after the container made of resin of this invention fills up a bottle with eating-and-drinking articles, such as a soft drink and soup, and sealing with a lid. Although the container made of resin is screwed on or capped with the lid made of resin and there are a stamp examining method using the agar medium as the microorganism test approach in opening of the container made of resin after sterilization processing, a multistory agar-medium method for cap-seal material, etc. Even if the container made of resin of this invention does not apply a superfluous elevated temperature, when it inspects by these approaches [ like ] etc. after heat sterilization processing, the microorganism which remained shall not be checked in said groove opening.

[0022]

[Effect of the Invention] Since high sealing performance can be acquired and the container made of resin of this invention does not produce a groove detailed opening in the container lumen after seal, without generating a crack, breakage, etc. of a container, even if it does not apply a superfluous elevated temperature, it can perform sufficient heat sterilization simple, and can prevent generating of a microbial contamination product. Therefore, it is useful as a container made of resin for being filled up with eating-and-drinking articles, such as a soft drink and soup.

[0023]

[Example] Hereafter, although an example explains this invention to a detail further, this invention is not limited to these.

[0024]

[Example 1] It had the configuration of opening typically shown in drawing 3, and the tilt angle theta 2 is 30 degrees, and the container made of resin which is the capacity of 500ml was prepared.

[0025] A lactic acidity drink solution (R. Brix 11.0, pH3.5, 0.2% of acidity) is heated to 85 degrees of solution temperature C. 500g heat restoration is carried out at said 20 containers made of resin, respectively. After screwing on the lid made of resin which carried out inside wearing of the cap-seal material (phi24.3mm) which 0.5ml (3x10<sup>4</sup> pieces/(ml)) of spore suspension which molds beforehand (Penicillium fusiculosum ATCC-9644) was made to adhere, and carried out the air dried The container made of resin was inverted immediately and it held for 30 seconds. Then, it returned to right \*\*\*\*\*, and cooled to 25-degreeC, and 25 degrees was saved for 21 days in a plane C constant temperature. After retention period termination, each container 20 made of resin cap-seal material was taken out, and it laid into the petri dish, respectively. After carrying out multistory until cap-seal material was immersed in the potato dextrose agar medium (EIKEN CHEMICAL CO., LTD. make) on it and it was covered, it cultivated for 25-degreeC and five days. Consequently, growth of mold was detected from no cap-seal material.

[0026]

[The example 1 of a comparison] It had opening of the configuration where a periphery edge is higher than an inner circumference edge typically shown in drawing 1, and theta 4 is 30 degrees whenever [ tilt-angle ], and the container made of resin which is the capacity of 500ml was prepared.

[0027] A lactic acidity drink solution (R. Brix 11.0, pH3.5, 0.2% of acidity) to 85 degrees of solution temperature C after heating 500g heat restoration is carried out at said 20 containers made of resin, respectively. After screwing on the lid made of resin which carried out inside wearing of the cap-seal material (phi24.3mm) to which it adhered and the air dried of the \*\*\*\*\* 3x10<sup>4</sup> piece/ml0.5ml which molds beforehand (Penicillium fusiculosum ATCC-9644) was carried out The container made of resin was inverted immediately and it held for 30 seconds. Then, it returned to right \*\*\*\*\*, and cooled to 25-degreeC, and 25 degrees was saved for 21 days in a plane C constant temperature. After retention period termination, each container 20 made of resin cap-seal material was taken out, and it laid into the petri dish, respectively. After carrying out multistory until cap-seal material was immersed in the potato dextrose agar medium (EIKEN CHEMICAL CO., LTD. make) on it and it was covered, it cultivated for 25-degreeC and five days. Consequently, growth of mold was detected from the inner circumference edge of the opening edge of all cap-seal material.

[0028]

[Example 2] It has the configuration of opening typically shown in drawing 4, and the container made of resin whose tilt angle theta 2 is 12 degrees, whose theta 3 is 30 degrees and which is the capacity of 500ml was prepared.

[0029] 100% reduction orange juice (R. Brix 12.0, pH3.80, 0.7% of acidity) of fruit juice to 85 degrees of temperature of goods C after heating 500g heat restoration is carried out at said 20 containers made of resin, respectively. After screwing on the lid made of resin which carried out inside wearing of the cap-seal material (phi24.3mm) to which it adhered and the air dried of the 0.5ml (3x10<sup>4</sup> pieces/(ml)) of the spore suspension which molds beforehand (*Penicillium fusiculosum* ATCC-9644) was carried out The container made of resin was inverted immediately and it held for 30 seconds. Then, it returned to right \*\*\*\*\*, and cooled to 25-degreeC, and 25 degrees was saved for 21 days in a plane C constant temperature. After retention period termination, each container 20 made of resin cap-seal material was taken out, and it laid into the petri dish, respectively. After carrying out multistory until cap-seal material was immersed in the potato dextrose agar medium (EIKEN CHEMICAL CO., LTD. make) on it and it was covered, it cultivated for 25-degreeC and five days. Consequently, growth of mold was detected from no cap-seal material.

[Translation done.]

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**DESCRIPTION OF DRAWINGS**

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view showing an example of the opening edge of the regio oralis of the conventional container made of resin.

[Drawing 2] It is the sectional view showing another example of the opening edge of the regio oralis of the conventional container made of resin.

[Drawing 3] It is the sectional view showing an example of the opening edge of the regio oralis of the container made of resin of this invention.

[Drawing 4] It is the sectional view showing another example of the opening edge of the regio oralis of the container made of resin of this invention.

[Drawing 5] It is the sectional view showing another example of the opening edge of the regio oralis of the container made of resin of this invention.

[Description of Notations]

11, 21, 31, 41, 51: The bottle made of resin

12, 22, 32, 42, 52: Cap-seal material of the lid made of resin

13, 23, 33, 43: The wall of opening of a bottle

14, 24, 34, 44: The line by which a bottle wall and cap-seal material touch

15, 25, 35, 45, 55: The field which touches the cap-seal material of opening

16, 36, 46, 56: Inner circumference edge

26: The inclination of a periphery edge

27: The inclination of an inner circumference edge

17, 37, 47, 57: Periphery edge

38, 48, 58: The field of opening

39, 49, 59: The line which connects the inner circumference edge and the periphery edge

[Translation done.]

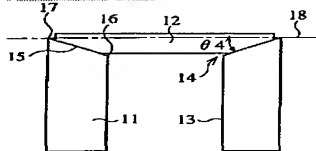
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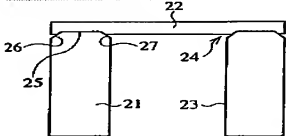
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**DRAWINGS**

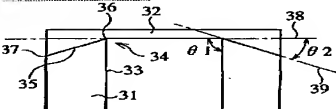
**[Drawing 1]**



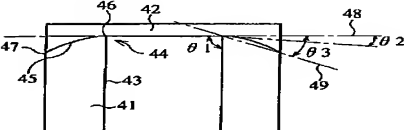
**[Drawing 2]**



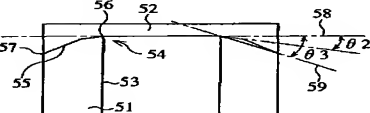
**[Drawing 3]**



**[Drawing 4]**



**[Drawing 5]**



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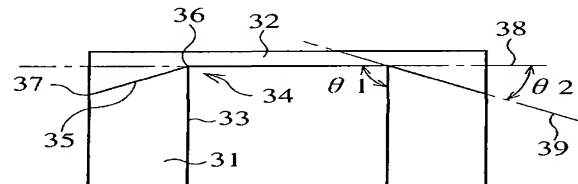
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(54) 【発明の名称】 樹脂製容器

## (57) 【要約】

【課題】 容器の亀裂や破損等を発生させることなく高い密封性を得ることができ、且つ密封後の容器内腔に微細な溝状の空隙を生じず加熱殺菌を簡便且つ確実に行うことができる樹脂製容器を提供する。

【解決手段】 樹脂製ボトルと樹脂製蓋とを含み、前記ボトルの開口の内壁が密封に際し前記蓋と90°～135度の角度で接する形状であり、前記開口の前記蓋に接する面が、その内周縁端から外周縁端に向かって低くなるよう傾斜し、前記開口の前記蓋に接する面の、内周縁端における傾斜角が、0度以上35度未満であることを特徴とする樹脂製容器。



## 【特許請求の範囲】

【請求項 1】 樹脂製ボトルと樹脂製蓋とを含み、前記ボトルの開口の内壁が密封に際し前記蓋と 90 度～135 度の角度で接する形状であり、前記開口の前記蓋に接する面が、その内周縁端から外周縁端に向かって低くなるよう傾斜し、前記開口の前記蓋に接する面の、内周縁端における傾斜角が、0 度以上 35 度未満であることを特徴とする樹脂製容器。

【請求項 2】 前記開口の前記蓋と接する面が前記内周縁端から前記外周縁端にわたり平坦であり、前記内周縁端における傾斜角が 5 度以上 35 度未満である請求項 1 記載の樹脂製容器。

【請求項 3】 前記開口の前記蓋と接する面が前記内周縁端から前記外周縁端にわたり凸状の曲面であり、前記内周縁端における傾斜角が 0 度以上 35 度未満である請求項 1 記載の樹脂製容器。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】本発明は、加熱殺菌を低温で簡便に十分行うことができる、飲食品等を充填するための樹脂製容器に関する。

## 【0002】

【従来の技術】近年、各種飲料等の液体の飲食品を充填するための容器として、ペットボトル等の樹脂製容器、特にボトル及び蓋のいずれもが樹脂製であるものが、軽量、低コスト、簡便性等の観点から消費者に評価され多く用いられている。

【0003】しかし、樹脂は金属、ガラス等の材料に比べて物理的強度において劣り、樹脂製ボトルに樹脂製蓋を螺着又は打栓する際の印加力を高くすると亀裂や破損等を招くため、かかる印加力が制限される。従って、容器の亀裂や破損等を発生させることなく高い密封性を得ることが困難であるという問題点がある。

【0004】容器の亀裂や破損等を発生させずに高い密封性を得るために、図 1 に示すように、ボトル 11 の口部開口端面 15 が、外周縁部 17 から内周縁部 16 に向かって低くなる（なお、本明細書において、ボトル開口面の位置の「高い」及び「低い」とは、図面において図示される通り、ボトル開口を上側に向けた場合の高さを意味する。）傾斜を設け、この面において蓋のシール材 12 とボトル 11 の開口端面とが接するようにした樹脂製容器が、従来より提案されている。また、図 2 に示すように、ボトル 21 の口部開口端面 25 の内周縁部と外周縁部の両方に傾斜 (26, 27) を設けた樹脂製容器が、従来より用いられている。このような容器を採用した場合、容器の亀裂や破損等を発生させず且つ密封性が良好となる。

【0005】しかしながら、このような樹脂製容器の場合、ボトルの内壁 (13, 23) とシール材 (12, 22) との接する線 (14, 24) 付近において、微細な溝状の空隙が生じやす

い。このような溝状の空隙は、容器の密封性には影響しないものの、密封後の殺菌の工程においてそこに気泡が付いたままの状態になりやすく、真菌等の微生物が液体に接液されず、加熱殺菌に際し加えた熱が伝達しにくくなりうる。もしそのような微生物が残存した場合、その後密封性が損なわれなくても微生物が繁殖しうることとなるので、接液されない微生物をも十分殺菌するためには、比較的高温、長時間の殺菌を行なう必要がある。

【0006】一方、金属製又はガラス製容器に比べて樹脂製容器は、耐熱性が劣り、加熱殺菌温度を高温にすると容器の変形を招くので、加熱殺菌を行う場合の加熱温度が制限される。さらに樹脂製容器は熱伝導性も低い。そのため、樹脂製容器では、容器に飲食品を充填した後に加熱殺菌を行う場合、前記の溝状の空隙等における殺菌をも十分に行え、且つ容器の変形を防ぐことができるよう、温度を厳密に制御し、長時間で殺菌をする必要があり、コストがかかるという問題点がある。

## 【0007】

【発明が解決しようとする課題】本発明の目的は、容器の亀裂や破損等を発生させることなく高い密封性を得ることができ、且つ密封後の容器内腔に微細な溝状の空隙を生じず加熱殺菌を簡便且つ確実に行うことができる樹脂製容器を提供することにある。

## 【0008】

【課題を解決するための手段】本発明者らは、上記の課題を解決するため、種々の形状の開口部を有する樹脂製容器において加熱殺菌処理時の生残微生物の試験を行なったところ、特定の形状の開口部を有する容器が上記課題を解決できることを見出し、本発明を完成した。

【0009】即ち、本発明によれば、樹脂製ボトルと樹脂製蓋とを含み、前記ボトルの開口の内壁が密封に際し前記蓋と 90～135 度の角度で接する形状であり、前記開口の前記蓋に接する面が、その内周縁端から外周縁端に向かって低くなるよう傾斜し、前記開口の前記蓋に接する面の、内周縁端における傾斜角が、0 度以上 35 度未満であることを特徴とする樹脂製容器が提供される。

【0010】また、本発明によれば、前記開口の前記蓋と接する面が前記内周縁端から前記外周縁端にわたり平坦であり、前記内周縁端における傾斜角が 5 度以上 35 度未満である前記樹脂製容器が提供される。

【0011】さらに、本発明によれば、前記開口の前記蓋と接する面が前記内周縁端から前記外周縁端にわたり凸状の曲面であり、前記内周縁端における傾斜角が 0 度以上 35 度未満である前記樹脂製容器が提供される。

## 【0012】

【発明の実施の形態】以下、本発明の樹脂製容器を、具体的な態様の例を図示する図 3 及び図 4 等を参照しながら説明する。

【0013】本発明の樹脂製容器は、樹脂製ボトル (31、

41)と樹脂製蓋とを含む。これらを構成する樹脂としては、特に限定されず、ポリエチレンテレフタレート（PET）、ポリプロピレン（PP）、ポリエチレン（PE）等の各種の樹脂を用いることができる。樹脂製蓋の形態は、ボトルの開口を密封できるものであれば特に限定されず、螺着又は打栓等により開口を覆うことができる各種の形態とすることができ、図3及び図4において図示されるシール材(32, 42)を含むか、または蓋とシール材とを一体のものとして成形したもの等とすることができる。図3及び図4において、シール材はボトル開口の外径と同一の寸法のものとして図示されているが、これより大きいもの、又は小さいものとすることもできる。前記シール材の材質は特に限定されないが、PET、PP、PE等のボトル等を構成する材質に加えてポリスチレン（PS）等を用いることができる。

【0014】本発明の樹脂製容器においては、ボトル(31, 41)の開口の内壁(33, 43)は、密封に際し蓋と90°～135度の角度で接する形状である。具体的には、内壁(33, 43)と蓋本体又は蓋に含まれるシール材(32, 42)とがなす角 $\theta 1$ は、90°～135度の範囲であり、好ましくは90°～120°とすることができる。 $\theta 1$ が90度未満の場合、内壁(33, 43)と蓋とが接する線(34, 44)上に気泡が溜まりやすくなり加熱殺菌に際し加えた熱が伝達しにくくなりうる部分が生じ、135度を越える場合先端部の強度が低下して品質管理上のトラブルを招きやすくなる等の不都合がある。

【0015】なお、内壁(33, 43)とボトルの開口の蓋に接する面(35, 45)とは、内周縁端(36, 46)において直角若しくは鋭角をなすが、実質的に内壁(33, 43)が蓋と前記特定の角度で接し、気泡が溜まることを防ぐことができる限りにおいて、内周縁端を面取りした形状とすることができる。

【0016】本発明の樹脂製容器においては、ボトルの開口の蓋に接する面(35, 45)が、その内周縁端(36, 46)から外周縁端(37, 47)に向かって低くなるよう傾斜する。本明細書において、ボトル開口の面の位置の「高い」及び「低い」とは、前述の通りボトル開口を上側に向けた場合の高さを意味する。内周縁端と外周縁端とを結ぶ線(39, 49)が、ボトルの開口の面(38, 48)となす角 $\theta 3$ は、特に限定されないが、5度以上45度未満の角とすることが好ましい。

【0017】本発明の樹脂製容器においては、面(35, 45)の内周縁端(36, 46)における傾斜角が、0度以上35度未満である。ここで面の内周縁端における傾斜角とは、内周縁端(36, 46)において面(35, 45)と開口の面(38, 48)とがなす角 $\theta 2$ をいう。

【0018】本発明の樹脂製容器における、開口の蓋に接する面の態様は、特に限定されないが、具体的には例えば、図3に示す通り、面35を、前記内周縁端から前記外周縁端にわたり平坦とすることができる。つまり、こ

の場合面35は、開口が円形であれば、円錐台形状の形状となる。この場合、面35と開口の面38とがなす角が傾斜角となる。このように開口の蓋に接する面が平坦である場合、角 $\theta 2$ は、0度を越える角度となる必要があり、5度以上35度未満であることが好ましい。

【0019】また、例えば図4に示す通り面45を凸状の曲面とすることもできる。この場合、前記傾斜角 $\theta 2$ は、0度以上35度未満とすることができ、また、内周縁端46と外周縁端47とを結ぶ線49が、ボトルの開口の面48となす角 $\theta 3$ は、特に限定されないが、5度以上45度未満の角とすることが好ましい。

【0020】さらに、例えば図5に示す通り、面55を多角形状の凸状の形状とすることもできる。この場合も、前記傾斜角 $\theta 2$ は、0度以上35度未満とすることができ、また、内周縁端56と外周縁端57とを結ぶ線59が、ボトルの開口の面58となす角 $\theta 3$ は、特に限定されないが、5度以上45度未満の角とすることが好ましい。

【0021】本発明の樹脂製容器は、清涼飲料、スープ等の飲食品をボトルに充填した後、蓋により密封してから加熱殺菌に供することができる。樹脂製容器に樹脂製蓋を螺着又は打栓し、滅菌処理後の樹脂製容器の開口部における微生物検査方法としては、寒天培地を用いたスタンプ試験法、キャップシール材に対する重層寒天培地法等があるが、本発明の樹脂製容器は、過剰な高温を適用しなくても、加熱殺菌処理後にこのような方法等により検査した場合、前記溝状の空隙において、残存した微生物が確認されないものとすることができる。

【0022】

【発明の効果】本発明の樹脂製容器は、容器の亀裂や破損等を発生させることなく高い密封性を得ることができる、且つ密封後の容器内腔に微細な溝状の空隙を生じないため、過剰な高温を適用しなくても簡便に十分な加熱殺菌を行うことができ、微生物汚染製品の発生を予防することができる。従って、清涼飲料、スープ等の飲食品を充填するための樹脂製容器として有用である。

【0023】

【実施例】以下、本発明を実施例によりさらに詳細に説明するが、本発明は、これらに限定されるものではない。

【0024】

【実施例1】図3に模式的に示される開口の形状を有し、傾斜角 $\theta 2$ が30°であり、容量500mlの樹脂製容器を調製した。

【0025】乳性酸性飲料溶液（R. Brix 11.0、pH 3.5、酸度0.2%）を液温85°Cまで加熱し、前記樹脂製容器20本にそれぞれ500g熱充填し、予めカビ（*Penicillium fumiculosum* ATCC-9644）の孢子懸濁液（ $3 \times 10^4$ 個/ml）0.5mlを付着させ風乾させたキャップシール材（Φ24.3mm）を内面装着した樹脂製

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蓋を螺着した後に、直ちに樹脂製容器を倒置して30秒間保持した。その後、正置状態に戻し25°Cまで冷却し、25°C恒温機中で21日間保存した。保存期間終了後に、樹脂製容器20本それぞれのキャップシール材を取り出し、それぞれシャーレ中に載置した。その上にポテトデキストロース寒天培地（栄研化学（株）製）を、キャップシール材が浸漬して覆われるまで重層した後に25°C、5日間培養した。その結果、カビの生育は全てのキャップシール材から検出されなかった。

【0026】

【比較例1】図1に模式的に示される、内周縁部よりも外周縁部が高い形状の開口を有し、傾斜角度 $\theta_4$ が30°であり、容量500mlの樹脂製容器を調製した。

【0027】乳性酸性飲料溶液（R. Brix 11.0、pH3.5、酸度0.2%）を液温85°Cまで加熱後に、前記樹脂製容器20本にそれぞれ500g熱充填し、予めカビ（*Penicillium fumiculosum* ATCC-9644）の孢子懸濁液 $3 \times 10^4$ 個/mlの0.5mlを付着し風乾させたキャップシール材（Φ24.3mm）を内面装着した樹脂製蓋を螺着した後に、直ちに樹脂製容器を倒置して30秒間保持した。その後、正置状態に戻し25°Cまで冷却し、25°C恒温機中で21日間保存した。保存期間終了後に、樹脂製容器20本それぞれのキャップシール材を取り出し、それぞれシャーレ中に載置した。その上にポテトデキストロース寒天培地（栄研化学（株）製）を、キャップシール材が浸漬して覆われるまで重層した後に25°C、5日間培養した。その結果、カビの生育は全てのキャップシール材の開口端の内周縁部から検出された。

【0028】

【実施例2】図4に模式的に示される開口の形状を有し、傾斜角 $\theta_2$ が12°であり、 $\theta_3$ が30°である、容量500mlの樹脂製容器を調製した。

【0029】果汁100%還元オレンジジュース（R. Brix 12.0、pH3.80、酸度0.7%）を品温85°Cまで加熱後に、前記樹脂製容器20本にそれぞれ500g熱充填し、予めカビ（*Penicillium fumiculosum* ATCC-9644

4）の孢子懸濁液（ $3 \times 10^4$ 個/ml）0.5mlを付着し風乾させたキャップシール材（Φ24.3mm）を内面装着した樹脂製蓋を螺着した後に、直ちに樹脂製容器を倒置して30秒間保持した。その後、正置状態に戻し25°Cまで冷却し、25°C恒温機中で21日間保存した。保存期間終了後に、樹脂製容器20本それぞれのキャップシール材を取り出し、それぞれシャーレ中に載置した。その上にポテトデキストロース寒天培地（栄研化学（株）製）を、キャップシール材が浸漬して覆われるまで重層した後に25°C、5日間培養した。その結果、カビの生育は全てのキャップシール材から検出されなかった。

【図面の簡単な説明】

【図1】従来の樹脂製容器の口部の開口端の一例を示す断面図である。

【図2】従来の樹脂製容器の口部の開口端の別の一例を示す断面図である。

【図3】本発明の樹脂製容器の口部の開口端の一例を示す断面図である。

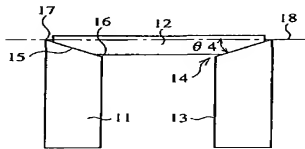
【図4】本発明の樹脂製容器の口部の開口端の別の一例を示す断面図である。

【図5】本発明の樹脂製容器の口部の開口端の別の一例を示す断面図である。

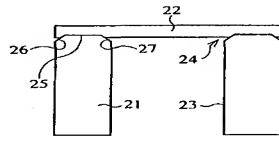
【符号の説明】

11, 21, 31, 41, 51：樹脂製ボトル  
12, 22, 32, 42, 52：樹脂製蓋のキャップシール材  
13, 23, 33, 43：ボトルの開口の内壁  
14, 24, 34, 44：ボトル内壁とキャップシール材とが接する線  
15, 25, 35, 45, 55：開口のキャップシール材に接する面  
16, 36, 46, 56：内周縁端  
26：外周縁部の傾斜  
27：内周縁部の傾斜  
17, 37, 47, 57：外周縁端  
38, 48, 58：開口の面  
39, 49, 59：内周縁端と外周縁端とを結ぶ線

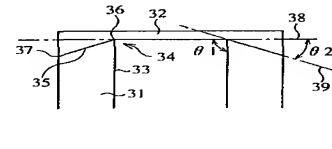
【図1】



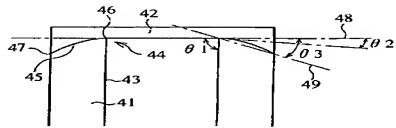
【図2】



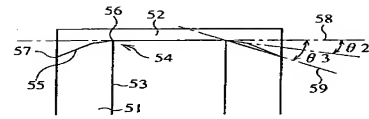
【図3】



【図 4】



【図 5】



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